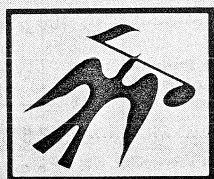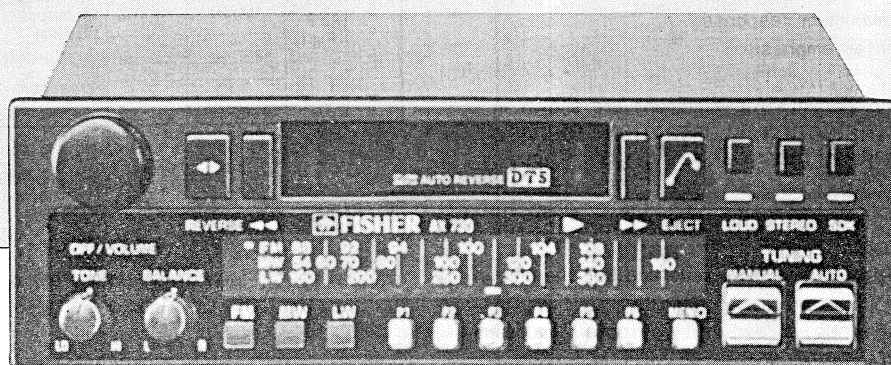# � FISHER®

# AX730

## FULL AUTO REVERSE
## CAR FIDELITY RECEIVER/
## CASSETTE PLAYER

# SPECIFICATIONS

## TUNER SECTION FM

Tuning Range (MHz) .................... 87.5—108 MHz

Channel Spacing (kHz) ................. 50 kHz (Auto)

50 kHz (Manual)

Sensitivity (150 ohms) .................... 2 μV

Limiting Sensitivity ......................... 4 μV

Auto Scan Stop Level (DX) ......... 10 μV

Image Rejection ............................. 60 dB

Selectivity (300 kHz) .................... 65 dB

AM-Suppression ........................... 45 dB

Capture Ratio ................................ 2 dB

THD Mono .................................. <0.3%

Stereo ................................. <0.5%

Frequency Response (—4.5dB) ...... 40—12,500 Hz

Channel Separation (1,000 Hz) ...... 35 dB

S/N Ratio FM.............................. 60 dB

## TUNER SECTION AM

Tuning Range MW........................... 522—1611 kHz

Tuning Range LW ......................... 153—360 kHz

Channel Spacing MW ..................... 9 kHz

LW ..................... 1 kHz

Frequency Response (—4.5 dB) ... 40—2,000 Hz

Image Rejection (1,400 kHz) ......... 55 dB

Selectivity (9 kHz) ........................ ±80 dB

Sensitivity MW .............................. 30 μV

LW .............................. 100 μV

## CASSETTE SECTION

Max. Speed Deviation .................... ±2.5%

Wow and Flutter ............................ ≦ 0.3%

Max. Winding Speed (C-60) ........... ≦ 100 sec.

Frequency Response $Fe_2O_3$ ........ 63—12,500 Hz

S/N Ratio ..................................... 48 dB

Crosstalk (1,000 Hz) .................... 45 dB

## GENERAL

Output Power (10%) ..................... 2x4.5W

DC Power Supply ........................... 11—15 volts

Current Drain (Power off) ............ 20 mA

(Power on)............... 2 A

Dimension (WxHxD) ..................... 178x51x160 mm

Weight ........................................ 1.5 kg

# ALIGNMENT PROCEDURES

General

Test Conditions

Signal generator output;

Modulation frequency 1000 Hz

Modulation percentage 30%

Signal level just high enough to provide meter deflection.

Signal application;

Antenna receptacle through the dummy antenna.

Output meter connection

Across a speaker or a dummy load 4 ohms.

Setting of radio controls;

Volume control at maximum response.

Tone control at center emphasis.

Power supply 14V

*Location of the components for alignment are shown in MAIN PARTS IDENTIFICATION ILLUSTRATION (TOP VIEW).

NOTE: THE HEAD MUST BE CLEANED AND DEGAUSSED BEFORE ANY TESTING.

Alignment of Head Azimuth

1. Insert a BASF 8kHz standard test tape and set the unit in play mode.
2. Turn the azimuth adjusting screw until you obtain maximum reading on the VTVM.

### MW, LW and RF Alignment

| Step | Signal Input | Frequency of Signal Gen | Dial Setting of Radio | Test Equipment Connection | Adjustment |
|---|---|---|---|---|---|
| 1 | MW | — | 522 kHz | Connect a Voltage Meter to TP901 and Common ground. | Adjust L305 for voltage to be 1.0V |
| 2 | LW | — | 153 kHz | | Adjust L306 for voltage to be 1.2V |
| 3 | Through dummy ANT (Fig. 1) | 603 kHz | 603 kHz | Connect a VTVM to output terminal | Tune T301,L303 for maximum output |
| 4 | | 999 kHz | 999 kHz | | Tune T303,304 for maximum output |
| 5 | | 164 kHz | 164 kHz | | Tune T302 for maximum output |
| 6 | | 200 kHz | 200 kHz | | Tune L304 for maximum output |
| 7 | | | | | Repeat steps 5,6 |

Figure 1    DUMMY ANTENNA FOR MW AND LW RF ALIGNMENT



$R1 = 80 - Rsg$ (ohms)

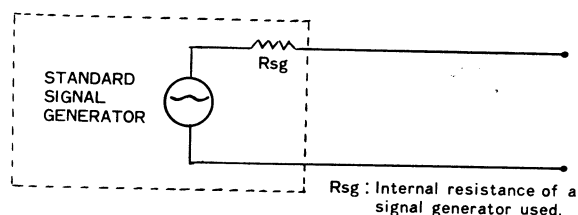Rsg : Internal resistance of a signal generator used.
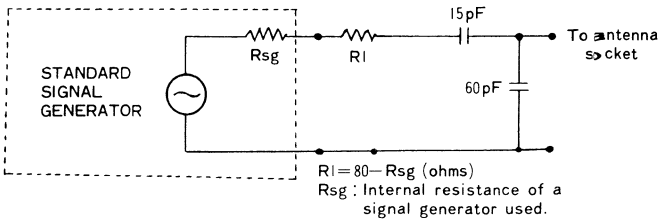
# ALIGNMENT PROCEDURES

## FM Alignment (No.1)

| Step | Signal Input | Frequency of Signal Gen | Dial Setting of Radio | Test Equipment Connection | Adjustment |
|---|---|---|---|---|---|
| 1 | Through dummy ANT. (Fig.2) | 98.00MHz | 98.00MHz | Connect a VTVM to SP terminal | Tune T401 for maximum output |
| 2 | | 98.026MHz (50dB) | | Connect a Voltage Meter to TP902 and Common Ground | Tune L201 for Center Voltage (3.5V) |
| 3 | | 98.030MHz (50dB) | | | Make Sure that Low Voltage (0V) |
| 4 | | 98.020MHz | | | Make Sure that High Voltage (7V) |
| 5 | | 98.00MHz | | Connect a VTVM to SP terminal | Adjust 3dB Limiting to be |

Figure 2    DUMMY ANTENNA FOR FM RF ALIGNMENT



STANDARD SIGNAL GENERATOR

Rsg

Rsg : Internal resistance of a signal generator used.

## FM Alignment (No.2)

| Step | Signal Input | Frequency of Signal Gen | Dial Setting of Radio | Test Equipment Connection | Adjustment |
|---|---|---|---|---|---|
| 10 | FM 17dbµ | 98.00MHz | — | — | In mono position. adjust R206 for search stop sensitivity |
| 11 | FM 47dbµ | 98.00MHz | — | — | In stereo position. adjust R219 for search stop sensitivity |

## FM MULTIPLEX ALIGNMENT (PLL)

PRELIMINARIES :

1. A stereo signal modulator (SSM) is necessary to perform this alignment.
2. All adjustments below must be done, setting the dial pointer at 98MHz on dial scale and applying 60dB FM signal modulated by specified signals as described below.
3. MPX button should be placed in stereo position in during FM multiplex alignment.

---

| Step | Alignment | Instrument Connections Input | Instrument Connections Output | Adjustment |
|---|---|---|---|---|
| 1 | 19kHz Pilot | No signal condition | Connect 500k~1MΩ to TP251 and common ground. Connect frequency counter to TP252 and common ground. | Adjust R250 for frequency to be 19.00kHz |
| 2 (1) | Stereo Signal | Apply FM stereo signal (modulated only by pilot signal at 10% modulation and stereo signal at 30% modulation) thro' dummy ant. to ant. terminals. Place output signal switch of S.S.M. in right position. | Connect VTVM to speaker output leads of Left Channel. | Stereo Separation Control R505 for minimum output on VTVM. |
| (2) | | In addition. Set the output signal under input level of 40dB. | Connect VTVM to speaker output leads of Left Channel. | Adjust control R214. To make a separation of 10dB between left and right channel. |

## TRAFFIC DECODER ALIGNMENT

1. Test Equipment Required
   * FM Signal Generator
   * FM Stereo Signal Generator
   * Traffic Decoder Signal Generator
   * Frequency Counter
   * V. T. V. M.
   * Oscilloscope (30MHz)
   * Oscilloscope (Audio)
   * DC Power Supply
   * 4 ohms Dummy Load

2. Traffic Decoder Test Equipment Set-up Diagram
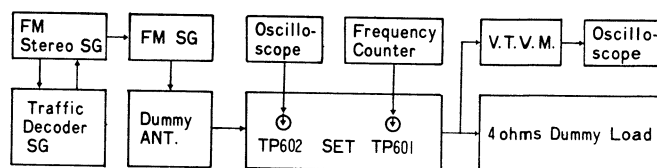


3. Alignment Procedure

| Step | Signal Input | FM SG | Stereo SG | Traffic SG | Dial Setting | Adjust For |
|---|---|---|---|---|---|---|
| 1 | Through dummy load. | 98MHz 1kHz 30% Mod. Input : 60dBu | — | — | 98MHz | — |
| 2 | | 98MHz EXT. Mod. Input; 60dBu | 19kHz Pilot signal OFF | 57kHz Traffic Signal OFF | 98MHz | R603 for 57kHz Connect the frequency counter to TP601. |
| 3 | | | No Mod. | 57kHz Traffic signal ON 3.75kHz Mod. | 98MHz | T601 Get to maximum output waveform after connecting oscilloscope to TP602. |
| 4 | | 98MHz Input; 60dBu | 19kHz off 30% Mod. 1kHz. | SK: 3.75kHz Mod. DK: ON(30%) BK: ON(60%) | 98MHz | When volume minimum and SDK button ON position. Adjust R661 for Output Voltage (Speaker terminal) to be 450mV. |

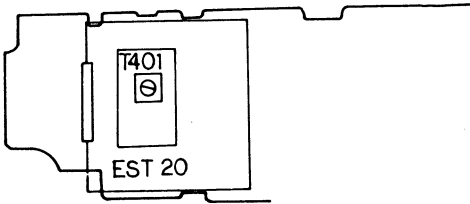## TRAFFIC DECODER ALIGNMENT (DK)

1. Connect frequency counter to TP651 and common ground.
2. Adjust R651 for frequency to be 125Hz.
3. Input is under the no signal condition.
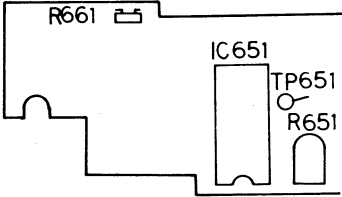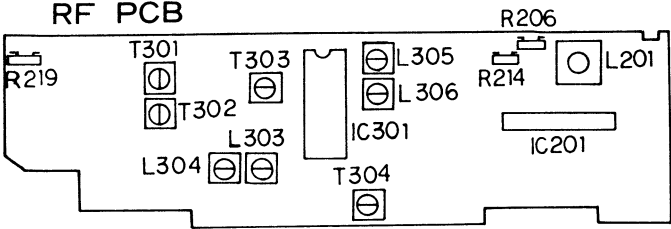
# MAIN PARTS IDENTIFICATION ILLUSTRATION

## LOGIC PCB
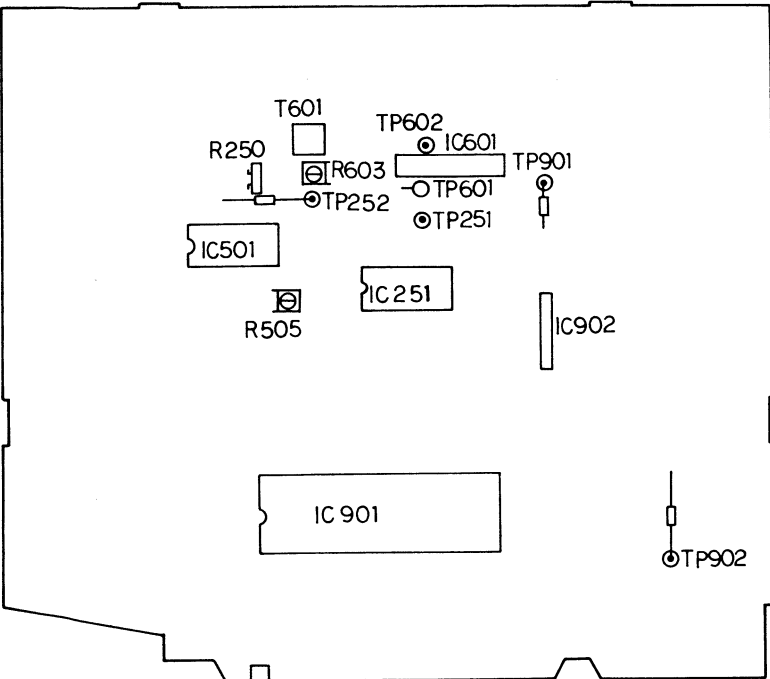


## TUNER PCB
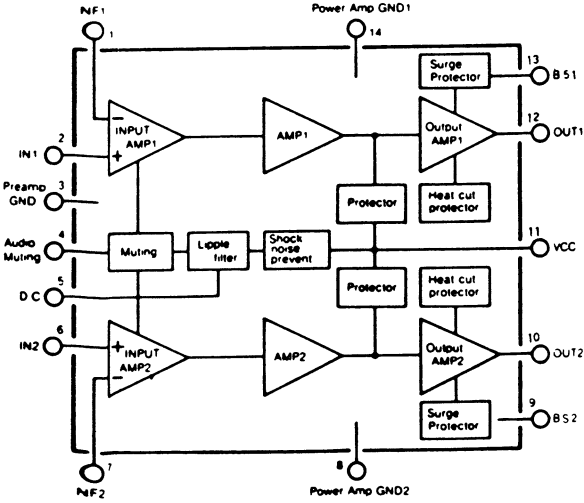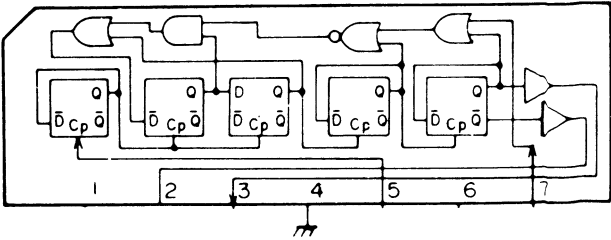


## SDK AMP PCB



## RF PCB



# IC FUNCTIONS (1)

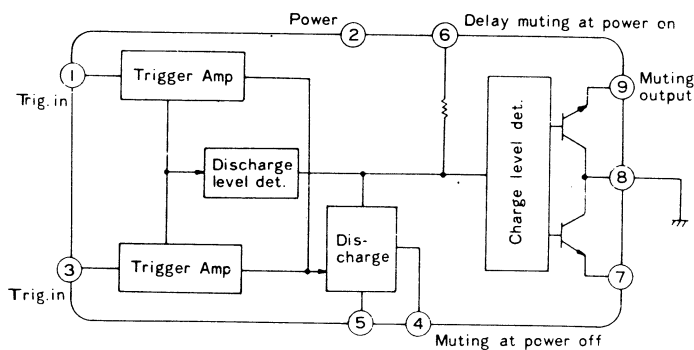## IC71, LA4440P



## IC902, TD6104P

## IC651, LA2211
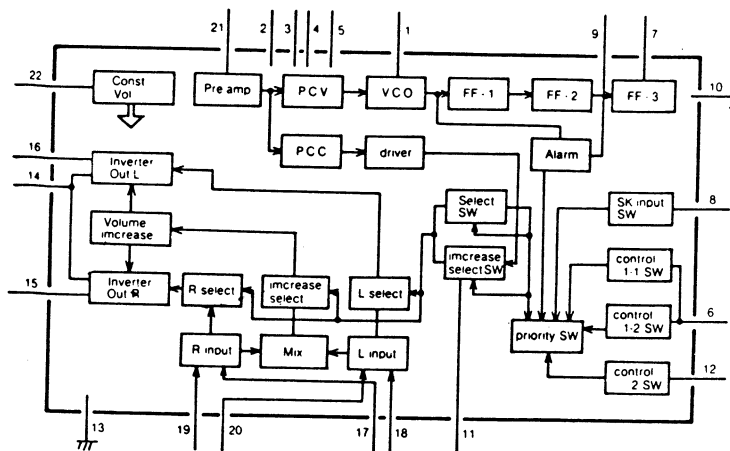


## IC501, LA2113
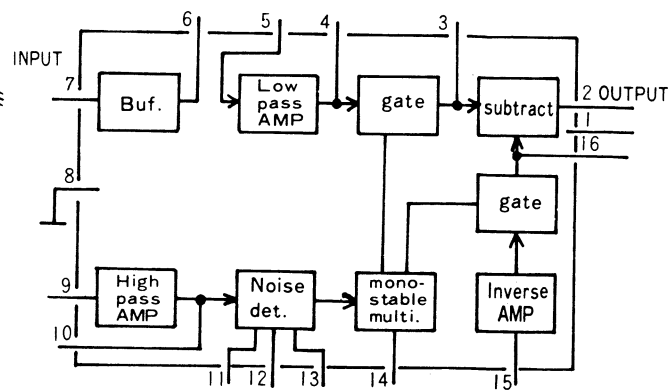


## IC903, TA7324P



## IC201, M51174L
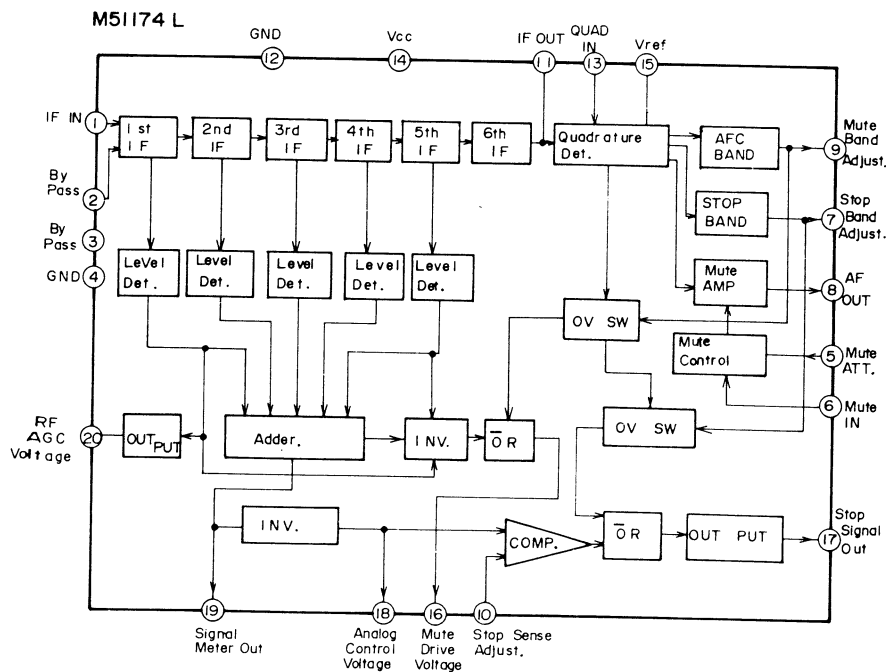
# WIRING DIAGRAM

LED PCB Bottom



LOGIC PCB Bottom

# SCHEMATIC DIAGRAM

## NOTES

1. RESISTOR VALUES IN OHMS. (k=1000)
2. CAPACITOR VALUES IN MICRO FARADS. (p=M.M.F.)
3. MODIFICATION MAY BE DONE WITHOUT ANY NOTICE.
4. THE MENTIONED OF UNIT ON THE IC ARE VOLTS.

| PIN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC 251 | 8.4 | 3.1 | 3.3 | 2.5 | 3.6 | 3.3 | 2.5 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | | | | | | |
| IC 501 | 8.4 | 3.5 | 4.7 | 4.7 | 4.2 | 4.2 | 4.8 | 0 | 1.6 | 3.0 | 0 | 2.3 | 0.4 | 0 | 4.5 | 4.6 | | | | | |
| IC 601 | 8.4 | 2.8 | 8.3 | 1.5 | 6.1 | 6.1 | 6.4 | 0 | 0.6 | 2.1 | 2.1 | 0.6 | 2.1 | 2.1 | 2.1 | 2.8 | | | | | |
| IC 902 | 7.6 | 6.4 | 6.1 | 0 | 5.6 | 5.6 | 2.6 | | | | | | | | | | | | | | |
| IC 903 | 14 | 3.1 | 1.3 | 5.2 | 0 | 2.7 | 0.2 | 0 | | | | | | | | | | | | | |
| IC 901 | 0 | 2.2 | 2.1 | 4.1 | 0 | 4.5 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.1 | 1.1 | 1.0 | 1.0 | 0.5 | | |
| | 0 | 0 | 2.4 | 2.5 | 2.0 | 2.7 | 2.8 | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.8 | 3.4 | 3.5 | 3.6 | 3.7 | 3.8 | 3.9 | 4.0 | 4.1 |

RF P.C.B. Bottom

CONTROL P.C.B. Bottom
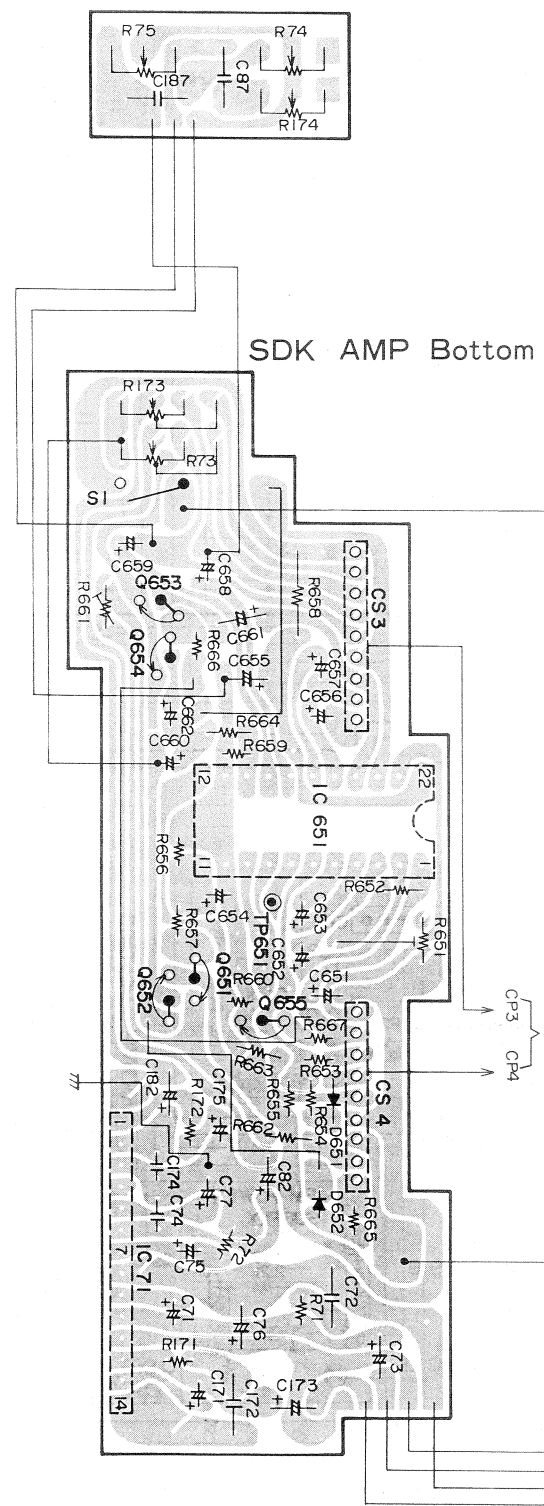
PRE P.C.B. Bottom

TUNER P.C.B. Bottom
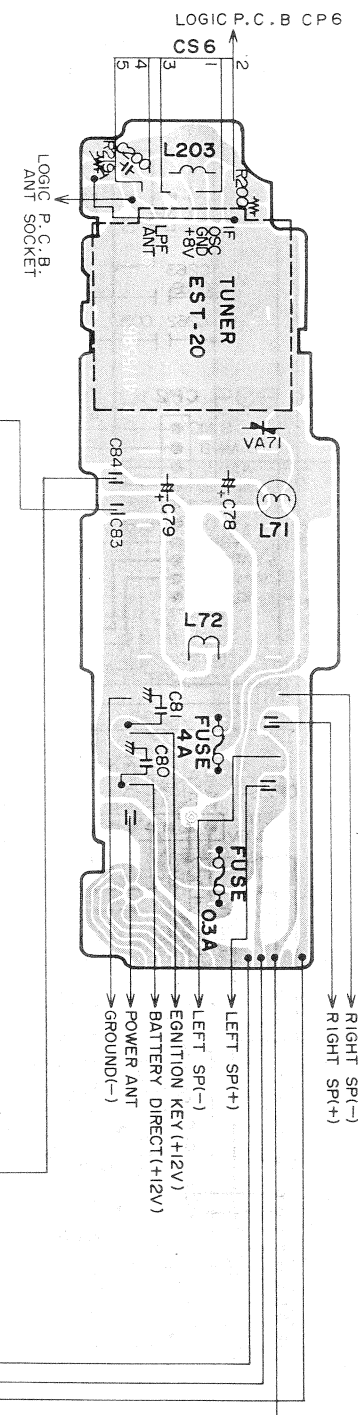
SDK AMP Bottom
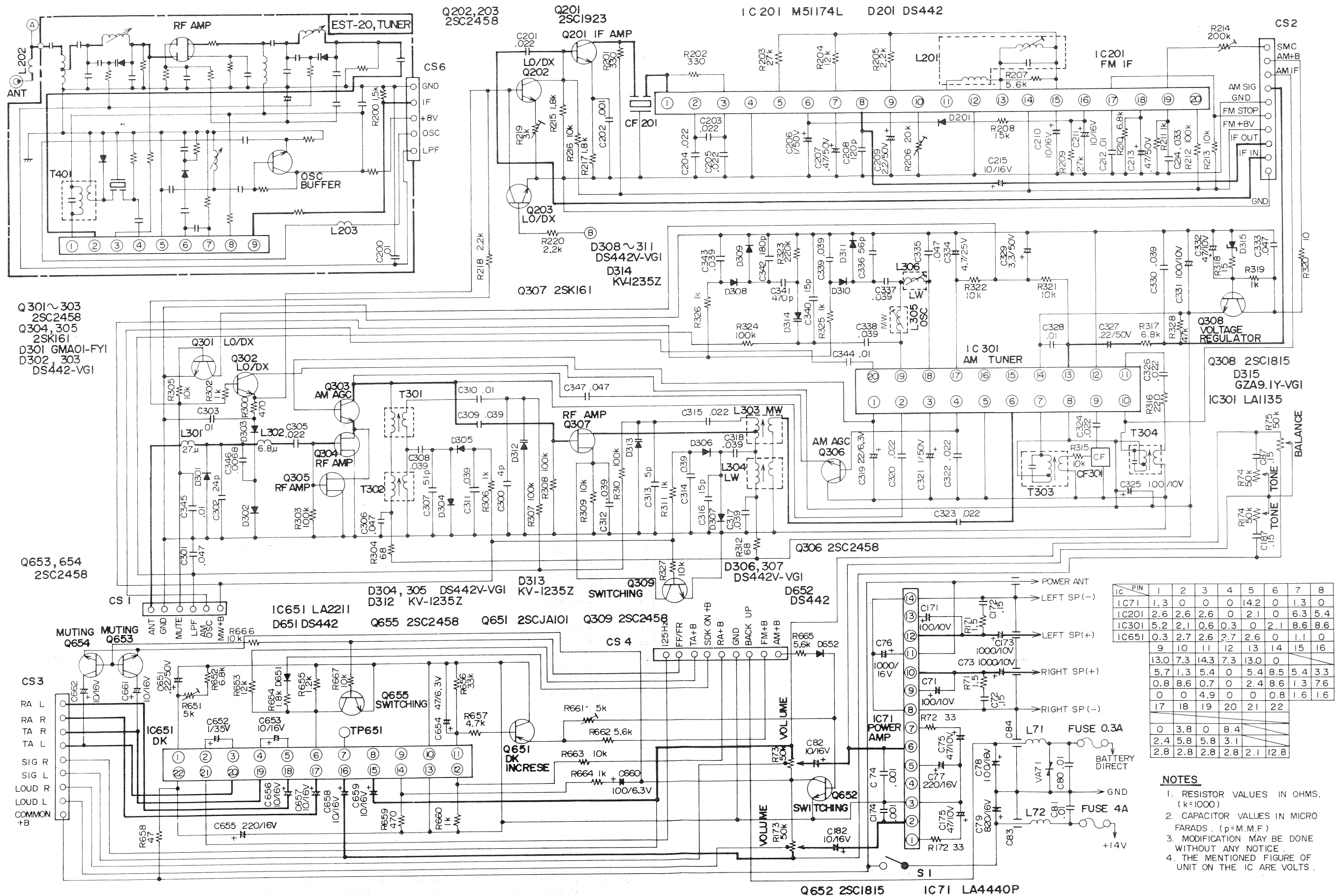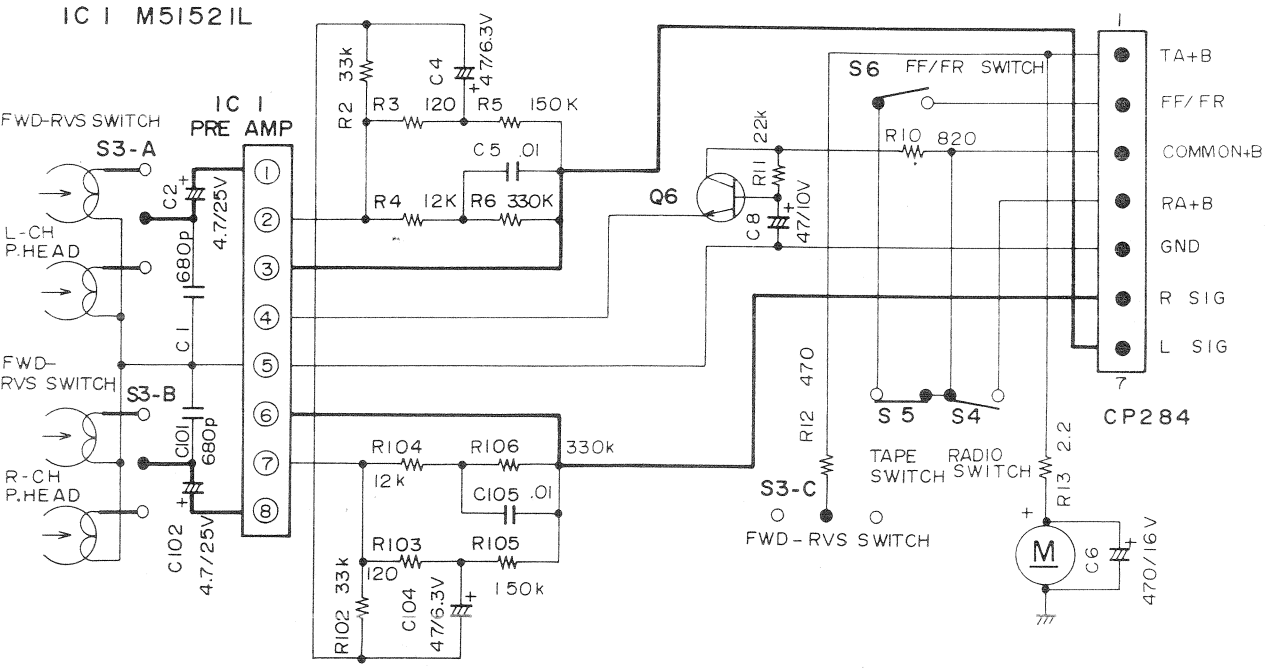
# SCHEMATIC DIAGRAM

IC 1 M5152IL

NOTES
1. RESISTOR VALUES IN OHMS. (k=1000)
2. CAPACITOR VALUES IN MICRO FARADS. (p=M.M.F)
3. MODIFICATION MAY BE DONE WITHOUT ANY NOTICE.
4. THE MENTIONED FIGURE OF UNIT ON THE IC ARE VOLTS.

| IC | PIN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----|-----|---|---|---|---|---|---|---|---|
| IC 1 | | 1.2 | 0.7 | 2.8 | 7.4 | 0 | 2.8 | 0.7 | 1.2 |

## PARTS LIST (CASSETTE MECHANISM)

### CASSETTE MECHANISM (R-S873290)

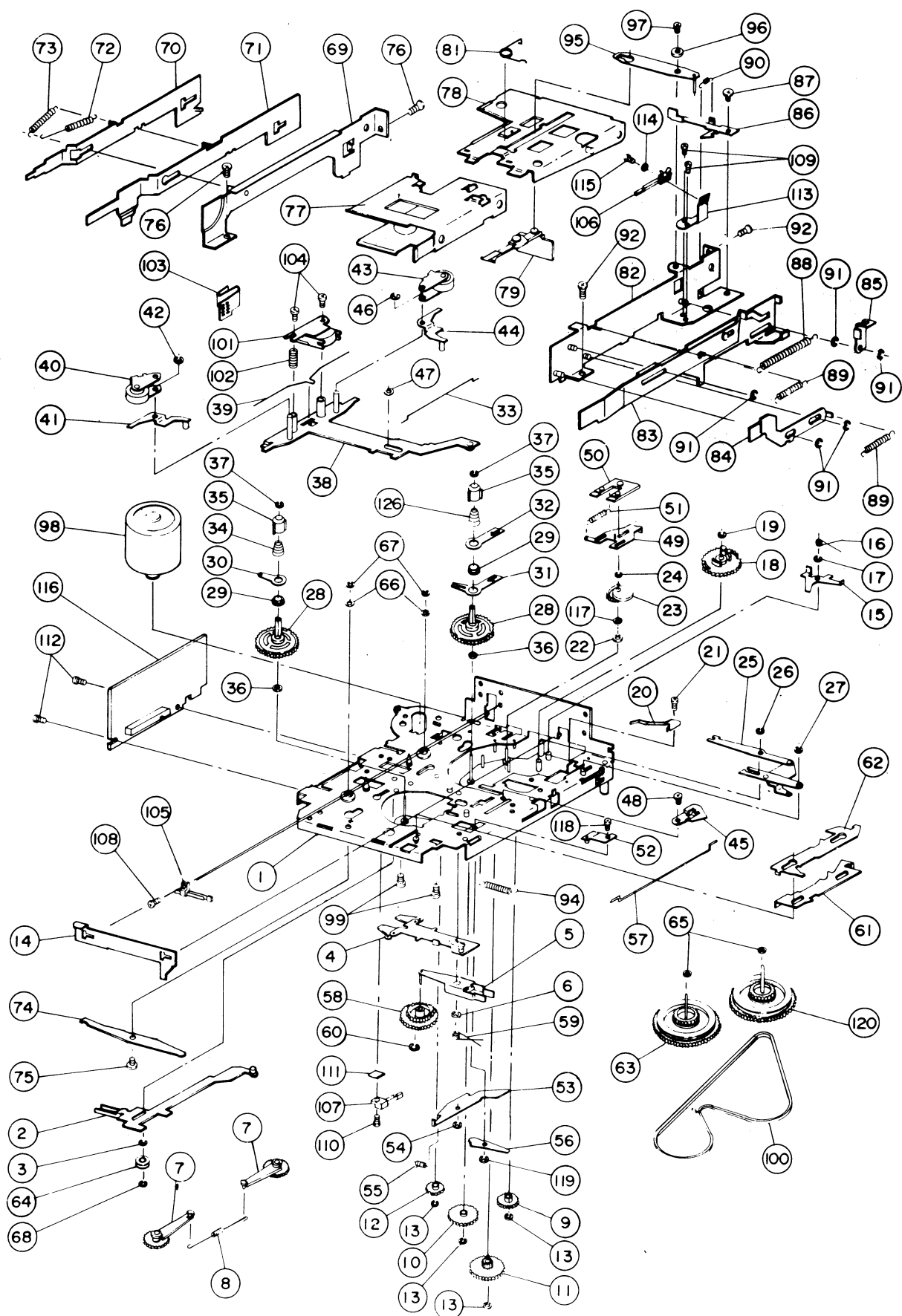| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 1 | | R-A701227 | Chassis ass'y | 1 |
| 2 | | R-A78799 | Lever ass'y, Reverse A | 1 |
| 3 | | W-SNUR15 | E-ring, 1.5 | 1 |
| 4 | | R-A78800 | Bracket ass'y, IDLER A | 1 |
| 5 | | R-A78801 | Bracket ass'y, FF | 1 |
| 6 | | W-SNUR30 | E-ring, 3 | 1 |
| 7 | | R-A78802 | Base ass'y, Idler gear E | 2 |
| 8 | | R-1571900A | Coil spring | 1 |
| 9 | | R-3975643A | Gear, Idler D | 1 |
| 10 | | R-3975642 | Gear, Idler B | 1 |
| 11 | | R-3975641A | Gear, Idler C | 1 |
| 12 | | R-3975640 | Gear, Idler A | 1 |
| 13 | | R-3972246 | Special washer | 4 |
| 14 | | R-1274540A | Lever, Rev F | 1 |
| 15 | | R-1274541 | Lever, Rev lock | 1 |
| 16 | | R-1571899 | Torsion spring | 1 |
| 17 | | W-SNUR15 | E-ring, 1.5 | 1 |
| 18 | | R-A78901 | Gear ass'y, Reverse | 1 |

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

— 12 —

## PARTS LIST (CASSETTE MECHANISM)

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 19 | W-SNUR15 | E-ring, 1.5 | 1 |
| 20 | R-137205A | Plate spring | 1 |
| 21 | B-SSTB171FZI | Screw, Pan Hd. T-TPS3 | 1 |
| 22 | R-137206 | Plate spring | 1 |
| 23 | R-3975638 | Gear, Drive | 1 |
| 117 | W-NSRW204025 | Washer TH, 2x4x0.25 | 1 |
| 24 | W-SNUR12 | E-ring, 1.2 | 1 |
| 25 | R-A78906 | Lever ass'y, Reverse | 1 |
| 26 | R-3972246 | Special washer | 1 |
| 27 | W-SNUR20 | E-ring, 2 | 1 |
| 28 | R-A78806 | Reel ass'y, Boss | 2 |
| 29 | R-3975634 | Spacer | 2 |
| 30 | R-137208 | Sensor, F | 1 |
| 31 | R-137209B | Sensor, FR | 1 |
| 32 | R-137210D | Sensor, R | 1 |
| 33 | R-1571902 | Wire spring | 1 |
| 34 | R-1571903B | Compression spring | 1 |
| 35 | R-3974102 | Reel guide | 2 |
| 126 | R-1572115 | Compression spring | 1 |
| 36 | W-NSRW204013 | Washer TH, 2x4x0.13 | 2 |
| 37 | R-3972246 | Special washer | 2 |
| 38 | R-A78903 | Lever ass'y, Head A | 1 |
| 39 | R-1571920 | Wire spring | 1 |
| 40 | R-A76271 | Lever ass'y, Pinch roller | 1 |
| 41 | R-A78808 | Lever ass'y, PF | 1 |
| 42 | W-SNUR20 | E-ring, 2 | 1 |
| 43 | R-A76272 | Lever ass'y, Pinch roller | 1 |
| 44 | R-A78809 | Lever ass'y, PR | 1 |
| 45 | R-1274627 | Lever, Eject D | 1 |
| 46 | W-SNUR20 | E-ring, 2 | 1 |
| 47 | R-3972423 | Special washer | 1 |
| 48 | R-1571962 | Special screw | 1 |
| 49 | R-A78810 | Sensor ass'y, Reverse | 1 |
| 50 | R-3975633A | Guide, Sensor | 1 |
| 51 | R-1571904 | Coil spring | 1 |
| 52 | R-A79346 | Bracket ass'y, FF, Lock | 1 |
| 118 | B-SSTB202EZI | Screw, Pan Hd., T-TPS3.2x2.5 | 1 |
| 53 | R-1274618A | Lever, FF lock | 1 |
| 54 | W-SNUR20 | E-ring, 2 | 1 |
| 55 | R-1571967 | Coil spring | 1 |
| 56 | R-1274617A | Lever, FF lock release | 1 |
| 57 | R-1571955A | Wire spring | 1 |
| 119 | W-SNUR20 | E-ring, 2 | 1 |
| 58 | R-3975632 | Gear, FF drive | 1 |
| 59 | R-1571911A | Torsion spring | 1 |
| 60 | R-3972423 | Special washer | 1 |
| 61 | R-1274554 | Lever, RWD A | 1 |
| 62 | R-1274555B | Lever, FF A | 1 |
| 63 | R-S872997 | Flywheel | 1 |
| 64 | R-S872484 | Pulley | 1 |
| 120 | R-S872997-L | Flywheel | 1 |
| 65 | W-NSRW204025 | Washer TH, 2x4x0.25 | 2 |
| 67 | R-3975768 | Special washer | 2 |
| 66 | R-3975767 | Special washer | 2 |
| 68 | R-3972246 | Special washer | 1 |
| 69 | R-A78815 | Bracket ass'y, Mecha left | 1 |
| 70 | R-1275166A | Lever, REV | 1 |
| 71 | R-1275167 | Lever, RWD | 1 |
| 72 | R-1571912A | Coil spring | 1 |
| 73 | R-1571913 | Coil spring | 1 |
| 74 | R-1274556A | Lever, RWD B | 1 |
| 75 | R-1571984 | Special screw | 1 |
| 76 | B-STSS2605ZI | Screw, Flat Hd., T-T S, 2.6x5 | 2 |
| 77 | R-1274566A | Case, A | 1 |

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 78 | R-A78816 | Case ass'y, B | 1 |
| 79 | R-A78817 | Guide ass'y, Cassette | 1 |
| 81 | R-1571914 | Torsion spring | 1 |
| 82 | R-A78818 | Bracket ass'y, Mecha right | 1 |
| 83 | R-A701032 | Lever ass'y, Eject A | 1 |
| 84 | R-1275170A | Lever, FF | 1 |
| 85 | R-1274563 | Lever, Slotin B | 1 |
| 86 | R-1274564 | Lever, Eject lock | 1 |
| 87 | R-1571897 | Special screw | 1 |
| 88 | R-1571915 | Coil spring | 1 |
| 89 | R-1571917 | Coil spring | 2 |
| 90 | R-1571918 | Coil spring | 1 |
| 91 | W-SNUR20 | E-ring, 2 | 5 |
| 92 | B-STSS2605ZI | Screw, Flat Hd., T-T S, 2.6x5 | 1 |
| 94 | R-1571964 | Coil spring | 1 |
| 95 | R-A78820 | Lever ass'y, Slotin A | 1 |
| 96 | R-2470263A | Sleeve, Slotin point | 1 |
| 97 | B-SSTR203EZI | Screw, Flat Hd., T-TPS3 | 1 |
| 98 | R-S7195-2 | DC motor | 1 |
| 99 | B-SNAB2603ZI | Screw, Pan Hd., 2.6x3 | 2 |
| 100 | R-4470708B | Square belt | 1 |
| 101 | R-S07461 | Playback head | 1 |
| 102 | R-1571919 | Compression spring | 1 |
| 103 | R-S37485 | FPC board | 1 |
| 104 | B-SPRM2004ZI | Screw, Bind Hd., +—, 2x4 | 2 |
| 105 | R-S47677 | Leaf switch | 1 |
| 106 | R-S47990 | Leaf switch | 1 |
| 107 | R-S47993B | Leaf switch | 1 |
| 108 | B-STSN2604ZI | Screw, Pan Hd., T-T S, 2.6x4 | 1 |
| 109 | B-SSTB172HZI | Screw, Pan Hd., T-TPS3 | 2 |
| 110 | B-SSTB202EZI | Screw, Pan Hd., T-TPS3, 2x2.5 | 1 |
| 111 | R-4174817 | Cover | 1 |
| 112 | B-SSTB172HZI | Screw, Pan Hd., T-TPS3 | 2 |
| 113 | R-1274728 | Bracket, Switch | 1 |
| 114 | W-SBOWI7803ZI | Washer flat, 1.7x3.8x0.3 | 1 |
| 115 | B-SSTB173EZI | Screw, Pan Hd., T-TPS3 | 1 |

### PRE P.C.B. ASSEMBLY

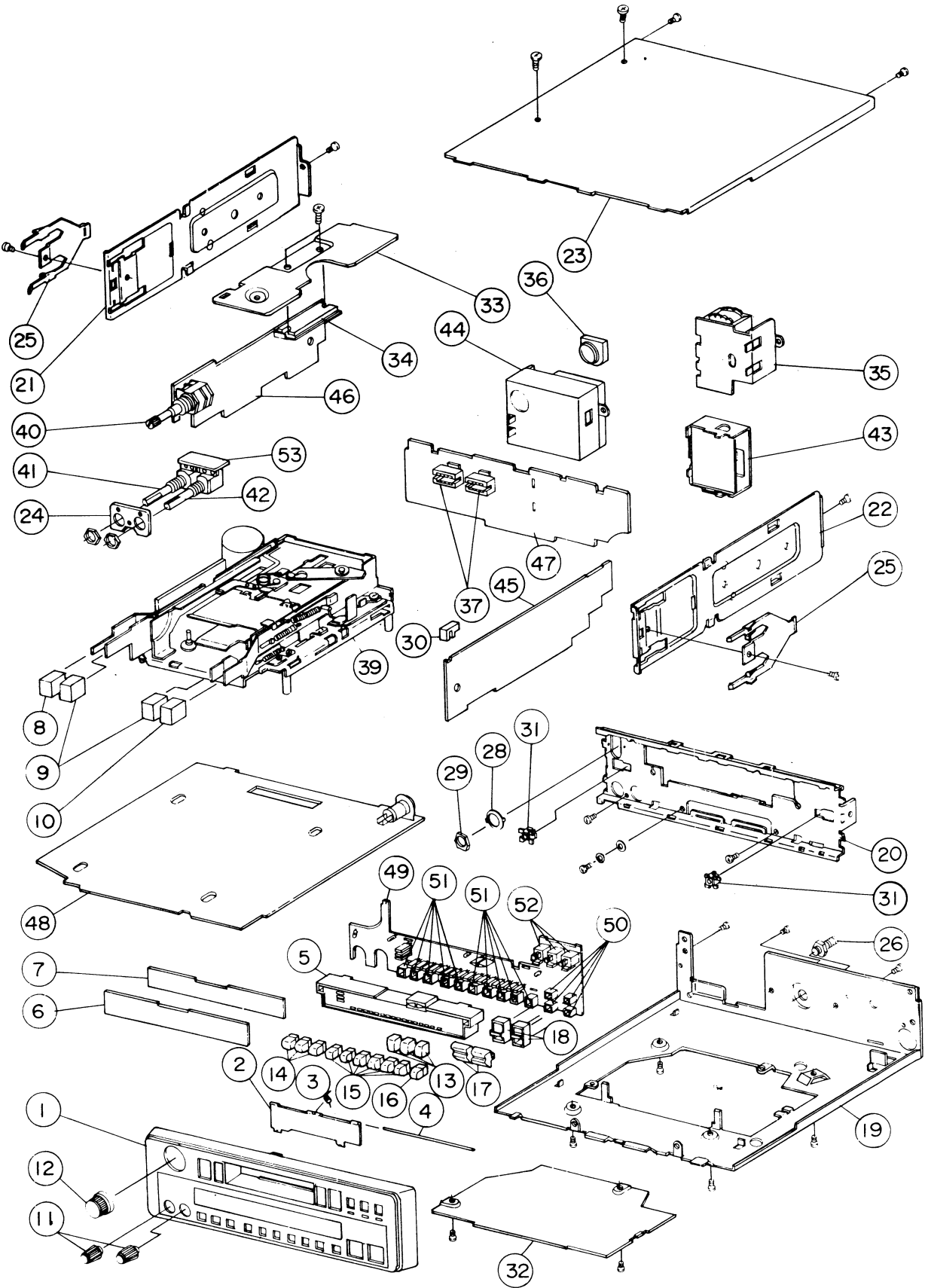| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 116 | | R-A701375 | PC board ass'y, PRE | 1 |
| | S3 | R-S47992-1 | Slide switch | 1 |
| | CS1 | R-S27507-12 | Cord, 120mm | 1 |
| | ICI | M5152IL | IC | 1 |
| | Q6 | 2SC1740 | Transistor | 1 |
| | C2,102 | EAR4R7M2EN2 | Lytic, 4.7μF, ±20%, 25V | 2 |
| | C4,104 | EAR470MIIN2 | Lytic, 47μF, ±20%, 6.3V | 2 |
| | C6 | EAS471M2CN2 | Lytic, 470μF, ±20%, 16V | 1 |
| | C8 | EGM470M2AN2 | Lytic, 47μF, ±20%, 10V | 1 |
| | C1,101 | KS681J2HN2 | Ceramic, 680pF, ±5%, 50V | 2 |
| | C5,105 | BM103K2EN2 | SBL, 0.01μF, ±10%, 25V | 2 |
| | R3 | T-D012IJBAN2 | Carbon, 120, ±5%, 1/6 W | 1 |
| | R2 | T-D0333JBAN2 | Carbon, 33k, ±5%, 1/6 W | 1 |
| | R102 | T-D0333JBAN1 | Carbon, 33k, ±5%, 1/6 W | 1 |
| | R103 | T-D012IJBAN1 | Carbon, 120, ±5%, 1/6 W | 1 |
| | R4 | T-D0123JBAN2 | Carbon, 12k, ±5%, 1/6 W | 1 |
| | R104 | T-D0123JBAN2 | Carbon, 12k, ±5%, 1/6 W | 1 |
| | R5,105 | T-D0154JBAN2 | Carbon, 150k, ±5%, 1/6 W | 2 |
| | R6 | T-D0334JBAN2 | Carbon, 330k, ±5%, 1/6 W | 1 |
| | R106 | T-D0334JBAN2 | Carbon, 330k, ±5%, 1/6 W | 1 |
| | R10 | T-D0821JBAN1 | Carbon, 820, ±5%, 1/6 W | 1 |
| | R11 | T-D0223JBAN2 | Carbon, 22k, ±5%, 1/6 W | 1 |
| | R12 | T-D471JAN2 | Carbon, 470, ±5%, 1/6 W | 1 |
| | R13 | T-D32R2JAN2 | Carbon, 2.2, ±5%, 1/2 W | 1 |

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

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# PARTS LIST

**INDIVIDUAL**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | | R-4076590-1 | Individual carton case | 1 |
| | | R-4174591 | Styro-foam cushion, Side | 2 |
| | | R-4777977 | Instruction book | 1 |
| | | R-4773695D | Guarantee card | 1 |
| | | R-4777000 | Guarantee card, FTZ | 1 |
| | | R-357529-1 | Polyethylene bag, 260x340 | 1 |

**ACCESSORY**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | | R-357527-1 | Polyethylene bag, 100x100 | 1 |
| | | R-S17348 | Fuse, 125V, 4A | 1 |
| | | R-S17174 | Fuse, 125V 0.3A | 1 |

**CABINET**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 1 | | R-A701885 | Nose panel ass'y | 1 |
| 2 | | R-2673870A | Door | 1 |
| 3 | | R-157679 | Torsion spring | 1 |
| 4 | | R-1570117 | Shaft | 1 |
| 5 | | R-3976407 | Back plate | 1 |
| 6 | | R-3870669 | Dial scale | 1 |
| 7 | | R-3870693 | Shade plate | 1 |
| 8 | | R-3976402 | Knob, REV | 1 |
| 9 | | R-3976403 | Knob, F. FWD | 2 |
| 10 | | R-3976404 | Knob, Eject | 1 |
| 11 | | R-3975546-1 | Knob, Volume, Tone, Balance | 2 |
| 12 | | R-3975606-1 | Knob, Volume, ON-OFF/Volume | 1 |
| 13 | | R-3976405 | Knob, Switch, Loud, Stereo, SDK | 3 |
| 14 | | R-3976406 | Knob, switch, FM, MW, L W | 3 |
| 15 | | R-3975537-1 | Knob, Switch, P1—P6 | 6 |
| 16 | | R-3975537-2 | Knob, Switch, MEMO | 1 |
| 17 | | R-3975528A | Knob, Tuning, Manual, Auto | 2 |
| 18 | | R-3975529 | Bracket, Switch, Manual, Auto | 2 |
| | | R-4777001-3 | Rating label | 1 |
| | | R-4777421 | Caution label | 1 |
| | | R-4776997-2 | Parts name label, 4A | 1 |
| | | R-4776997-1 | Parts name label, 0.3A | 1 |
| | | R-4777245 | Cover, Fisher | 1 |
| | | R-4777117 | Label, SDK | 1 |

**CHASSIS**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 19 | | R-1275327 | Metal casing, Base | 1 |
| 20 | | R-1275328 | Front chassis | 1 |
| | | B-STBN2604Z1 | Screw, Pan Hd., T-T B, 2.6x4 | 2 |
| 21 | | R-1275383 | Side chassis, LEFT | 1 |
| 22 | | R-1274449A | Side chassis, RIGHT | 1 |
| | | B-STBS3006Z1 | Screw, Flat Hd., T-T B, 3x6 | 2 |
| 23 | | R-1275342 | Top lid | 1 |
| | | B-STBN3006Z1 | Screw, Pan Hd., T-T B, 3x6 | 4 |
| 24 | | R-1275326 | Bracket, Resistor | 1 |
| | | B-STBN2606Z1 | Screw, Pan Hd., T-T B, 2.6x6 | 1 |
| 25 | | R-1274465A | Plate spring | 2 |
| 26 | | R-1571833 | Special screw | 1 |
| 28 | | R-1270744 | Special washer | 1 |
| 29 | | R-247206 | Special Nut | 1 |
| 30 | | R-3975538 | Bracket, PC board | 1 |
| 31 | | R-3975527 | Bracket, PC board, Front | 2 |
| | | B-STBN2606Z1 | Screw, Pan Hd., T-T B, 2.6x6 | 2 |
| 32 | | R-1273801 | Cover | 1 |
| | | B-STBN2605Z1 | Screw, Pan Hd., T-T B, 2.6x5 | 2 |
| | | B-SNAB2605Z1 | Screw, Pan Hd., 2.6x5, Mechanism | 4 |
| 33 | | R-2673869 | Heat sink | 1 |
| | | B-STBN3006Z1 | Screw, Pan Hd., T-T B, 3x6 | 1 |
| 34 | | R-1273734 | Bracket, IC | 1 |
| | | B-SNAB3010Z1 | Screw, Pan Hd., 3x10, IC | 2 |
| 35 | | R-1274466 | Shield case | 1 |
| | | B-STBN2605Z1 | Screw, Pan Hd., T-T B, 2.6x5, Metal casing seald case | 1 |
| 36 | | R-3975585 | Cap, DIN socket | 1 |
| 37 | | R-367280A | Fixture, DIN socket | 2 |
| | | B-SNAB2605Z1 | Screw, Pan Hd., 2.6x5, DIN socket | 2 |
| | | R-4470723 | Cushion, Logic P.C.B. | 2 |
| | | R-437458 | Felt cushion, RF P.C.B. | 1 |

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 38 | | R-4172934 | Rubber cushion, RF P.C.B. | |

**CHASSIS ELECTRICAL**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 39 | | R-S873290 | Cassette mechanism, FEC-284 | 1 |
| 40 | R73,173, S1 | R-R1107026-1 | Rotary volume, 50kx2 | 1 |
| 41 | R74,174 | R-R1107017-1 | Rotary volume, 50kx2 | 1 |
| 42 | R75 | R-R1107027 | Rotary volume, 50k | 1 |
| 43 | | R-S872990 | Tuner, EST-20 | 1 |
| 44 | | R-S27694-2 | Socket, Power SP | 1 |
| | | R-S17174 | Fuse, 125V 0.3A | 1 |
| | | R-S17348 | Fuse, 125V 4A | 1 |
| | CS1 | R-S27647-6 | Socket, 6P | 1 |
| | CS2 | R-S27647-10 | Socket, 10P | 1 |
| | CS3,4 | R-S27647-9 | Socket, 9P | 2 |
| | CS5 | R-S27516-16 | Cord, 160mm | 1 |
| | CS6 | R-S27515-10 | Cord, 100mm | 1 |
| | CS7 | R-S27513-22 | Cord, 220mm | 1 |
| | CS901, 902 | R-S27652-12 | Socket, 12P | 2 |
| | | R-S17115 | Pilot lamp, 5V 60mA | 3 |
| | | R-S871393-3 | Pilot lamp ass'y, 5V 60mA | 3 |
| | D948,949, 950 | SLP-174B | LED | 3 |
| | D932~ 947 | SLP-159B | LED | 16 |
| | D954,955 | LN328GP | LED | 2 |
| | D953 | SLP-255B | LED | 1 |
| | D951 | SLP-455B | LED | 1 |
| | D952 | SLP-155B | LED | 1 |
| | C87,187 | C-FMZ154J2HN2 | TF cap, 0.15µF, ±5%, 50V | 2 |
| | C83,84 | R-C4716-2 | Noise suppression cap | 2 |
| | L72 | R-W67067-1A | Choke coil | 1 |
| | L71 | R-W17068 | Choke coil, 3MH | 1 |
| 50 | S904~ 907 | R-S47971 | Key switch | 4 |
| 53 | | R-4175584-2 | PC board, Control | 1 |

**RF P.C.B. ASSEMBLY**

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 45 | | R-A701891 | PC board ass'y, RF | 1 |
| | CF301 | R-S17637 | Ceramic filter, 450kHz | 1 |
| | CF201 | R-S17572-1 | Ceramic filter, 10.700MHz | 1 |
| | R219 | R-R110738 | Preset resistor, 3k | 1 |
| | R206 | R-R110758 | Preset resistor, 20k | 1 |
| | R214 | R-R110742 | Preset resistor, 200k ohm | 1 |
| | L301 | R-W17082-4 | Choke coil, 27µH | 1 |
| | L302 | R-W17082-3 | Choke coil, 6.8µH | 1 |
| | T301, L303 | R-W27133 | RF coil | 2 |
| | T302 | R-W27138A | RF coil | 1 |
| | L304 | R-W27139 | Antenna coil | 1 |
| | L305 | R-W87035 | OSC coil | 1 |
| | L306 | R-W8796-3 | OSC coil | 1 |
| | T303 | R-W5T7023-1 | IF transformer | 1 |
| | T304 | R-W5T7025 | IF transformer | 1 |
| | L201 | R-W5T7063-1 | IF transformer | 1 |
| | IC301 | LA1135 | IC | 1 |
| | IC201 | M51174L | IC | 1 |
| | Q301-303, 306,309, 202,203 | 2SC2458GR | Transistor | 7 |
| | Q304,305, 307 | 2SK161GR | Transistor | 3 |
| | Q308 | 2SC1815GR | Transistor | 1 |
| | Q201 | 2SC1923O | Transistor | 1 |
| | D301 | GMA01-FY1 | Diode | 1 |
| | D302,303 201 | IS2473VH | Diode | 3 |
| | D304~ 311 | DS442V-VG1 | Diode | 8 |
| | D312,313 314 | KV1235Z | Varactor diode, Do not use diodes from different chips but a pair of diodes from a same chip. | 3/3 |
| | D315 | GZA9R1Y-VG1 | Zener diode | 1 |
| | C319 | C-EMK220M11N2 | Lytic, 22µF, ±20%, 6.3V | 1 |

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

# PARTS LIST

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | C327 | C-EMKR22MHN2 | Lytic, 0.22μF, ±20%, 50V | 1 |
| | C331,325 | C-EGW101M2AN2 | Lytic, 100μF, ±20%, 10V | 2 |
| | C332 | C-EGW470M2AN2 | Lytic, 47μF, ±20%, 10V | 1 |
| | C329 | C-EMK3R3M2HN2 | Lytic, 3.3μF, ±20%, 50V | 1 |
| | C334 | C-EMK4R7M2EN2 | Lytic, 4.7μF, ±20%, 25V | 1 |
| | C207,213 | C-EMKR47M2HN2 | Lytic, 0.47μF, ±20%, 50V | 2 |
| | C209 | C-EMKR2M2HN2 | Lytic, 2.2μF, ±20%, 50V | 1 |
| | C210,211,215 | C-EMK100M2CN2 | Lytic, 10μF, ±20%, 16V | 3 |
| | C206,321 | C-EMKIR0M2HN2 | Lytic, 1μF, ±20%, 50V | 2 |
| | C300 | C-CJ4R0D2HN2 | Ceramic, 4pF, ±0.5pF, 50V | 1 |
| | C302 | C-CJ240K2HN2 | Ceramic, 24pF, ±10%, 50V | 1 |
| | C307 | C-CJ510K2HN2 | Ceramic, 51pF, ±10%, 50V | 1 |
| | C313 | C-CJ5R0D2HN2 | Ceramic, 5pF, ±0.5pF, 50V | 1 |
| | C316,340 | C-CJ150K2HN2 | Ceramic, 15pF, ±10%, 50V | 2 |
| | C336 | C-CJ560K2HN2 | Ceramic, 56pF, ±10%, 50V | 1 |
| | C341 | C-KS471J2HN2 | Ceramic, 470pF, ±5%, 50V | 1 |
| | C342 | C-KS181J2HN2 | Ceramic, 180pF, ±5%, 50V | 1 |
| | C208 | C-CJ121K2HN2 | Ceramic, 120pF, ±10%, 50V | 1 |
| | C301,306,333,335,347 | C-BM473M2EN2 | SBL, 0.047μF, ±20%, 25V | 5 |
| | C303,310,328,344,345,212 | C-BM103M2EN2 | SBL, 0.01μF, ±20%, 25V | 6 |
| | C305,322,323,201 | C-BM223M2EN2 | SBL, 0.022μF, ±20%, 25V | 4 |
| | C203,204,205 | C-BM223M2EN2 | SBL, 0.022μF, ±20%, 25V | 3 |
| | C308,311,312,314,317,318 | C-BM393M2EN2 | SBL, 0.039μF, ±20%, 25V | 6 |
| | C309,330,337~339,343 | C-BM393M2EN2 | SBL, 0.039μF, ±20%, 25V | 6 |
| | C315,320,324,326 | C-BM223M2EN2 | SBL, 0.022μF, ±20%, 25V | 4 |
| | C202 | C-BM102M2EN2 | SBL, 0.001μF, ±20%, 25V | 1 |
| | C214 | C-BM333M2EN2 | SBL, 0.033μF, ±20%, 25V | 1 |
| | C346 | C-BM682M2EN2 | SBL, 0.0068μF, ±20%, 25V | 1 |
| | R204 | T-D0123JBN2 | Carbon, 12k, 5%, ¼W | 1 |
| | R303,307,308,310 | T-D0104JBN2 | Carbon, 100k, ±5%, ¼W | 4 |
| | R304,312 | T-D0680JBN2 | Carbon, 68, ±5%, ¼W | 2 |
| | R302,306,311,319,325 | T-D0102JBN2 | Carbon, 1k, ±5%, ¼W | 5 |
| | R326 | T-D0102JBN2 | Carbon, 1k, ±5%, ¼W | 1 |
| | R218,205,220 | T-D0222JBN2 | Carbon, 2.2k, ±5%, ¼W | 3 |
| | R316 | T-D0221JBN2 | Carbon, 220, ±5%, ¼W | 1 |
| | R328 | T-D0473JBN2 | Carbon, 47k, ±5%, ¼W | 1 |
| | R320,315 | T-D0100JBN2 | Carbon, 10, ±5%, ¼W | 2 |
| | R305,321,322,327,309 | T-D0103JBN2 | Carbon, 10k, ±5%, ¼W | 5 |
| | R213,216 | T-D0103JBN2 | Carbon, 10k, ±5%, ¼W | 2 |
| | R323 | T-D0224JBN2 | Carbon, 220k, ±5%, ¼W | 1 |
| | R324,212 | T-D0104JBN1 | Carbon, 100k, ±5%, ¼W | 2 |
| | R318 | T-D0150JBN2 | Carbon, 15, ±5%, ¼W | 1 |
| | R201,202 | T-D0331JBN2 | Carbon, 330, ±5%, ¼W | 2 |
| | R215,217 | T-D0182JBN2 | Carbon, 1.8k, ±5%, ¼W | 2 |
| | R207 | T-D0562JBN2 | Carbon, 5.6k, ±5%, ¼W | 1 |
| | R208 | T-D0153JBN2 | Carbon, 15k, ±5%, ¼W | 1 |
| | R203,209 | T-D0273JBN2 | Carbon, 27k, ±5%, ¼W | 2 |
| | R210,317 | T-D0682JBN2 | Carbon, 6.8k, ±5%, ¼W | 2 |
| | R211 | T-D0102JBAN2 | Carbon, 1k, ±5%, ⅙W | 1 |
| | R300 | T-D0471JBN2 | Carbon, 470, ±5%, ¼W | 1 |

## SDK AMP P.C.B. ASSEMBLY

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 46 | | R-A701886 | PC board ass'y, SDK AMP | 1 |
| | R661 | R-R110730 | Preset resistor, 5k | 1 |
| | R651 | R-R110729 | Preset resistor, 5k | 1 |
| | IC651 | LA2211 | IC | 1 |
| | IC71 | LA4440P | IC | 1 |

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | Q652 | 2SC1815GR | Transistor | 1 |
| | Q651 | JA101Q | Transistor | 1 |
| | Q653~655 | 2SC2458GR | Transistor | 3 |
| | D651,652 | DS442VG1 / IS2473VH | Diode | 2 |
| | C654 | C-EGM47M1IN2 | Lytic, 47μF, ±20%, 6.3V | 1 |
| | C655 | C-EGM221M2CN2 | Lytic, 220μF, ±20%, 16V | 1 |
| | C656~659,653 | C-EGMI00M2CN2 | Lytic, 10μF, ±20%, 16V | 5 |
| | C660 | C-EGMI01M1IN2 | Lytic, 100μF, ±20%, 6.3V | 1 |
| | C82,182,661,662 | C-EGMI00M2CF2 | Lytic, 10μF, ±20%, 16V | 4 |
| | C71,171 | C-EGW101M2AN2 | Lytic, 100μF, ±20%, 10V | 2 |
| | C73,173 | C-EGW102M2AN2 | Lytic, 1000μF, ±20%, 10V | 2 |
| | C75,175 | C-EGW470M2AN2 | Lytic, 47μF, ±20%, 10V | 2 |
| | C76 | C-EGW102M2CN2 | Lytic, 1000μF, ±20%, 16V | 1 |
| | C77 | C-EGW221M2CN2 | Lytic, 220μF, ±20%, 16V | 1 |
| | C651 | C-SMR22M6FN2 | Tantal, 0.22μF, ±20%, 35V | 1 |
| | C652 | C-SMIR0M6FN2 | Tantal, 1.0μF, ±20%, 35V | 1 |
| | C74,174 | C-BM102M2EN2 | SBL, 0.001μF, ±20%, 25V | 2 |
| | C72,172 | C-FMZI54J2HN2 | TF cap, 0.15μF, ±5%, 50V | 2 |
| | R658 | T-D0470JBN1 | Carbon, 47, ±5%, ¼W | 1 |
| | R652 | T-D0682JBN2 | Carbon, 6.8k, ±5%, ¼W | 1 |
| | R653 | T-D0123JBN2 | Carbon, 12k, ±5%, ¼W | 1 |
| | R654 | T-D0182JBN2 | Carbon, 1.8k, ±5%, ¼W | 1 |
| | R655 | T-D0122JBN2 | Carbon, 1.2k, ±5%, ¼W | 1 |
| | R656 | T-D0333JBN2 | Carbon, 33k, ±5%, ¼W | 1 |
| | R657 | T-D0472JBN2 | Carbon, 4.7k, ±5%, ¼W | 1 |
| | R659 | T-D0471JBN2 | Carbon, 470, ±5%, ¼W | 1 |
| | R660,664 | T-D0102JBN2 | Carbon, 1k, ±5%, ¼W | 2 |
| | R662,665 | T-D0562JBN2 | Carbon, 5.6k, ±5%, ¼W | 2 |
| | R663,666,667 | T-D0103JBN2 | Carbon, 10k, ±5%, ¼W | 3 |
| | R71,171 | T-D01R5JBN2 | Carbon, 1.5, ±5%, ¼W | 2 |
| | R72,172 | T-D0330JBN2 | Carbon, 33, ±5%, ¼W | 2 |

## TUNER P.C.B. ASSEMBLY

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 47 | | R-A701887 | PC board ass'y, Tuner | 1 |
| | L202,203 | R-W17082-5 | Choke coil, 0.27μH | 2 |
| | D71 | ERZM10DK220 | Variable resistor diode | 1 |
| | C79 | C-EAS82IM2CN2 | Lytic, 820μF, ±20%, 16V | 1 |
| | C78 | C-EAHI01M2CN2 | Lytic, 100μF, ±20%, 16V | 1 |
| | C80,81 | C-KFI03Z2HN2 | Ceramic, 0.01μF, +80−20%, 50V | 2 |
| | C200 | C-BMI03M2EN2 | SBL, 0.01μF, ±20%, 25V | 1 |
| | R200 | T-D0152JBAN1 | Carbon, 1.5k, ±5%, ⅙W | 1 |

## LOGIC P.C.B. ASSEMBLY

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 48 | | R-A701888 | PC board ass'y, LOGIC | 1 |
| | X901 | R-S17353 | Crystal oscillator | 1 |
| | CP6 | R-S27321-5 | Plug, 5P | 1 |
| | CP7 | R-S27321-3 | Plug, 3P | 1 |
| | CP284 | R-S27321-7 | Plug, 7P | 1 |
| | CP5 | R-S27321-6 | Plug, 6P | 1 |
| | CP4,3 | R-S27207-9 | Plug, 9P | 2 |
| | CP1 | R-S27207-6 | Plug, 6P | 1 |
| | CP2 | R-S27207-10 | Plug, 10P | 1 |
| | CR501 | R-CXC719 | Packed C&R | 1 |
| | T601 | R-W5T795 | IF transformer | 1 |
| | ANT | R-S27192-1A | Socket | 1 |
| | R505,603 | R-R1107020 | Preset resistor, 5k | 2 |
| | R250 | R-RI107020-4 | Preset resistor, 10k | 1 |
| | IC901 | TC9146AP | LSI | 1 |
| | IC902 | TD6104P | IC | 1 |
| | IC903 | TA7324P | IC | 1 |
| | IC501 | LA2113 | IC | 1 |
| | IC251 | LA3373 | IC | 1 |
| | IC601 | LA2205 | IC | 1 |
| | Q901~908,911~914,920~924 | 2SC2021E | Transistor | 18 |
| | Q909,52,152 | 2SA937MQ | Transistor | 3 |
| | Q910,916,918,51,151 | 2SC2458GR | Transistor | 5 |

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

# PARTS LIST

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | Q915 | 2SB698F | Transistor | 1 |
| | Q917,919 | JA101Q | Transistor | 2 |
| | D921,922,923, 251,919 | GMA01-FYI | Diode | 5 |
| | D902,903 | GZA5R6Y | Zener diode | 2 |
| | D904~915 | DS442-AT | Diode | 12 |
| | D917,918,920, 924,925 | DS442-AT | Diode | 5 |
| | D931,257 | DS442-AT | Diode | 2 |
| | D916 | GZA10X | Zener diode | 1 |
| | D926,252~ 256,601,602, 956,957 | DS442VGI IS2473VH | Diode | 10 |
| | D927,929,930 | GZA9RIY-VGI | Zener diode | 3 |
| | D928 | GZA7R5Y | Zener diode | 1 |
| | D900,901 | SM-IA-02 ERB12-02 | Diode | 2 |
| | C939 | C-EMK330M2AN2 | Lytic, 33μF, ±20%, 10V | 1 |
| | C54,154 | C-EMKRI0M2HN2 | Lytic, 0.1μF, ±20%, 50V | 2 |
| | C901,903, 911,251 | C-EMK100M2CN2 | Lytic, 10μF, ±20%, 16V | 4 |
| | C264,265,935, 603,612,11 | C-EMK100M2CN2 | Lytic, 10μF, ±20%, 16V | 6 |
| | C56,111,504 | C-EMK100M2CN2 | Lytic, 10μF, ±20%, 16V | 3 |
| | C905,55 | C-EGW10IM2AN2 | Lytic, 100μF, ±20%, 10V | 2 |
| | C914 | C-EGW10IM2CN2 | Lytic, 100μF, ±20%, 16V | 1 |
| | C917 | C-EGM470M2AN2 | Lytic, 47μF, ±20%, 10V | 1 |
| | C920,257,902 | C-EMKIR0M2HN2 | Lytic, 1μF, ±20%, 50V | 3 |
| | C922 | C-EMK4R7M2EN2 | Lytic, 4.7μF, ±20%, 25V | 1 |
| | C923,604 | C-EGMI0IMIIN2 | Lytic, 100μF, ±20%, 6.3V | 2 |
| | C928,929, 931,932 | C-EGM470M2AN2 | Lytic, 47μF, ±20%, 10V | 4 |
| | C509 | C-EGM220M2AN2 | Lytic, 22μF, ±20%, 10V | 1 |
| | C252 | C-EGMI0M2HN2 | Lytic, 0.1μF, ±20%, 50V | 1 |
| | C258 | C-EMK2R2M2HN2 | Lytic, 2.2μF, ±20%, 50V | 1 |
| | C259 | C-EMK3R3M2HN2 | Lytic, 3.3μF, ±20%, 50V | 1 |
| | C52,152,53, 153,924 | C-EMK220MIIN2 | Lytic, 22μF, ±20%, 6.3V | 5 |
| | C610 | C-EGM4R7M2EN2 | Lytic, 4.7μF, ±20%, 25V | 1 |
| | C611,912,913 | C-EGMIR0M2HN2 | Lytic, 1μF, ±20%, 50V | 3 |
| | C938 | C-EGR220MIIN2 | Lytic, 22μF, ±20%, 6.3V | 1 |
| | C266 | C-BM333M2EN2 | SBL, 0.033μF, ±20%, 25V | 1 |
| | C904,925,927, 930,256,933 | C-BM393M2EN2 | SBL, 0.039μF, ±20%, 25V | 6 |
| | C934,936,937 | C-BM393M2EN2 | SBL, 0.039μF, ±20%, 25V | 3 |
| | C908,909,910, 916,919,926 | C-BM103M2EN2 | SBL, 0.01μF, ±20%, 25V | 6 |
| | C507,508,253, 921,941 | C-BM103M2EN2 | SBL, 0.01μF, ±20%, 25V | 5 |
| | C915,510,609 | C-BM222M2EN2 | SBL, 0.0022μF, ±20%, 25V | 3 |
| | C918 | C-BM223M2EN2 | SBL, 0.022μF, ±20%, 25V | 1 |
| | C502 | C-BM182M2EN2 | SBL, 0.0018μF, ±20%, 25V | 1 |
| | C501 | C-BM122M2EN2 | SBL, 0.0012μF, ±20%, 25V | 1 |
| | C511 | C-BM682M2EN2 | SBL, 0.0068μF, ±20%, 25V | 1 |
| | C254,255 | C-BM153M2EN2 | SBL, 0.015μF, ±20%, 25V | 2 |
| | C512 | C-BM332M2EN2 | SBL, 0.0033μF, ±20%, 25V | 1 |
| | C607 | C-BM102M2EN2 | SBL, 0.001μF, ±20%, 25V | 1 |
| | C51,151 | C-BM152M2EN2 | SBL, 0.0015μF, ±20%, 25V | 2 |
| | C262,263 | C-BM392M2EN2 | SBL, 0.0039μF, ±20%, 25V | 2 |
| | C940 | C-CJI50J2HN2 | Ceramic, 15pF, ±5%, 50V | 1 |
| | C906 | C-CJ330K2HN2 | Ceramic, 33pF, ±10%, 50V | 1 |
| | C505 | C-KB681K2HN2 | Ceramic, 680pF, ±10%, 50V | 1 |
| | C503 | C-CJ680K2HN2 | Ceramic, 68pF, ±10%, 50V | 1 |
| | C506 | C-KB331K2HN2 | Ceramic, 330pF, ±10%, 50V | 1 |
| | C261 | C-KS561J2HN2 | Ceramic, 560pF, ±5%, 50V | 1 |
| | C602 | C-CC151J2HN2 | Ceramic, 150pF, ±5%, 50V | 1 |
| | C601 | C-CC201J2HN2 | Ceramic, 200pF, ±5%, 50V | 1 |
| | C606 | C-KS102J2HN2 | Ceramic, 0.001μF, ±5%, 50V | 1 |
| | C608 | C-KB221K2HN2 | Ceramic, 220pF, ±10%, 50V | 1 |
| | C907 | C-CJI00D2HN2 | Ceramic, 10pF, ±0.5pF, 50V | 1 |
| | C260 | C-QMN47IM2HN2 | Mylar, 470pF, ±20%, 50V | 1 |
| | C605 | C-QMX102M2HN2 | Mylar, 0.001μF, ±20%, 50V | 1 |
| | R913 | T-D0823JBN2 | Carbon, 82k, 5%, 1/4 W | 1 |
| | R951 | T-D0101JBAN2 | Carbon, 100, ±5%, 1/6 W | 1 |
| | R905,906,251, 259,260,600 | T-D0103JBAN2 | Carbon, 10k, ±5%, 1/6 W | 6 |

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| | R920,969 | T-D0472JBN2 | Carbon, 4.7k, ±5%, 1/4 W | 2 |
| | R929,954,956, 941,944,946 | T-D0102JBN2 | Carbon, 1k, ±5%, 1/4 W | 6 |
| | R948,506,601, 610 | T-D0102JBN2 | Carbon, 1k, ±5%, 1/4 W | 4 |
| | R932,930 | T-D0473JBAN2 | Carbon, 47k, ±5%, 1/6 W | 2 |
| | R942,945, 267,914 | T-D0104JBN2 | Carbon, 100k, ±5%, 1/4 W | 4 |
| | R926,602 | T-D0561JBN2 | Carbon, 560, ±5%, 1/4 W | 2 |
| | R936 | T-D0103JBN2 | Carbon, 10k, ±5%, 1/4 W | 1 |
| | R940,952 | T-D0102JBAN2 | Carbon, 1k, ±5%, 1/6 W | 2 |
| | R937,967,268, 52,968 | T-D0104JBAN2 | Carbon, 100k, ±5%, 1/6 W | 5 |
| | R953 | T-D0100JBN2 | Carbon, 10, ±5%, 1/4 W | 1 |
| | R943,947 | T-D0222JBN2 | Carbon, 2.2k, ±5%, 1/4 W | 2 |
| | R501 | T-D0392JBAN2 | Carbon, 3.9k, ±5%, 1/6 W | 1 |
| | R502,503,504, 931,933 | T-D0472JBAN2 | Carbon, 4.7k, ±5%, 1/6 W | 5 |
| | R507 | T-D0333JBN2 | Carbon, 33k, ±5%, 1/4 W | 1 |
| | R508 | T-D0682JBN2 | Carbon, 6.8k, ±5%, 1/4 W | 1 |
| | R254 | T-D0682JBAN2 | Carbon, 6.8k, ±5%, 1/6 W | 1 |
| | R255 | T-D0273JBAN2 | Carbon, 27k, ±5%, 1/6 W | 1 |
| | R256 | T-D0122JBN2 | Carbon, 1.2k, ±5%, 1/4 W | 1 |
| | R258 | T-D0153JBN2 | Carbon, 15k, ±5%, 1/4 W | 1 |
| | R261,262 | T-D0223JBN2 | Carbon, 22k, ±5%, 1/4 W | 2 |
| | R604 | T-D0332JBNI | Carbon, 3.3k, ±5%, 1/4 W | 1 |
| | R606 | T-D0562JBN2 | Carbon, 5.6k, ±5%, 1/4 W | 1 |
| | R111 | T-D0473JBN2 | Carbon, 47k, ±5%, 1/4 W | 1 |
| | R55 | T-D0683JBN2 | Carbon, 68k, ±5%, 1/4 W | 1 |
| | R58 | T-D0393JBN2 | Carbon, 39k, ±5%, 1/4 W | 1 |
| | R605 | T-D0272JBN2 | Carbon, 2.7k, ±5%, 1/4 W | 1 |
| | R155 | T-D0683JBATI | Carbon, 68k, ±5%, 1/6 W | 1 |
| | R53,54,928, 901,908,966 | T-D0104JBATI | Carbon, 100k, ±5%, 1/6 W | 6 |
| | R152~154 | T-D0104JBATI | Carbon, 100k, ±5%, 1/6 W | 3 |
| | R907,917,934, 902,925,922 | T-D0103JBATI | Carbon, 10k, ±5%, 1/6 W | 6 |
| | R918,935,964,958 | T-D0103JBATI | Carbon, 10k, ±5%, 1/6 W | 4 |
| | R903 | T-D0220JBATI | Carbon, 22, ±5%, 1/6 W | 1 |
| | R904 | T-D0223JBATI | Carbon, 22k, ±5%, 1/6 W | 1 |
| | R923,252, 253,607 | T-D0332JBATI | Carbon, 3.3k, ±5%, 1/6 W | 4 |
| | R924 | T-D0472JBATI | Carbon, 4.7k, ±5%, 1/6 W | 1 |
| | R921,939,965 | T-D0222JBATI | Carbon, 2.2k, ±5%, 1/6 W | 3 |
| | R916 | T-D0105JBATI | Carbon, 1M, ±5%, 1/6 W | 1 |
| | R11 | T-D0473JBATI | Carbon, 47k, ±5%, 1/6 W | 1 |
| | R909,910, 911,912 | T-D0221JBATI | Carbon, 220, ±5%, 1/6 W | 4 |
| | R919 | T-D0154JBATI | Carbon, 150k, ±5%, 1/6 W | 1 |
| | R938,950,257, 609,56,57 | T-D0102JBATI | Carbon, 1k, ±5%, 1/6 W | 6 |
| | R927 | T-D0102JBATI | Carbon, 1k, ±5%, 1/6 W | 1 |
| | R949,955 | T-D0100JBATI | Carbon, 10, ±5%, 1/6 W | 2 |
| | R509 | D-D0333JBATI | Carbon, 33k, ±5%, 1/4 W | 1 |
| | R957 | T-D0563JBATI | Carbon, 56k, ±5%, 1/6 W | 1 |
| | R608 | T-D0394JBATI | Carbon, 390k, ±5%, 1/6 W | 1 |
| | R51,151 | T-D0272JBATI | Carbon, 2.7k, ±5%, 1/6 W | 2 |

## LED P.C.B. ASSEMBLY

| Key No. | Ref. No. | Part No. | Description | Q'ty |
|---|---|---|---|---|
| 49 | | R-A701889 | PC board ass'y, LED | 1 |
| 51 | S901~903, 908~914 | R-S47970 | Key switch | 10 |
| 52 | S917-AB S916-AB S915-AB | R-S47989 | Push switch | 3 |
| | CP901,902 | R-S27649-12 | Plug,-12P | 2 |
| | R959 | T-D0561JBANI | Carbon, 560, ±5%, 1/6 W | 1 |
| | R960~962 | T-D0390JBNI | Carbon, 39, ±5%, 1/4 W | 3 |
| | R963 | T-D0221JBANI | Carbon, 220, ±5%, 1/6 W | 1 |

NOTES: 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

# DESCRIPTIONS————————————————————————————————————

## 1. BASIC OPERATION OF PLL FREQUENCY SYNTHESIZER
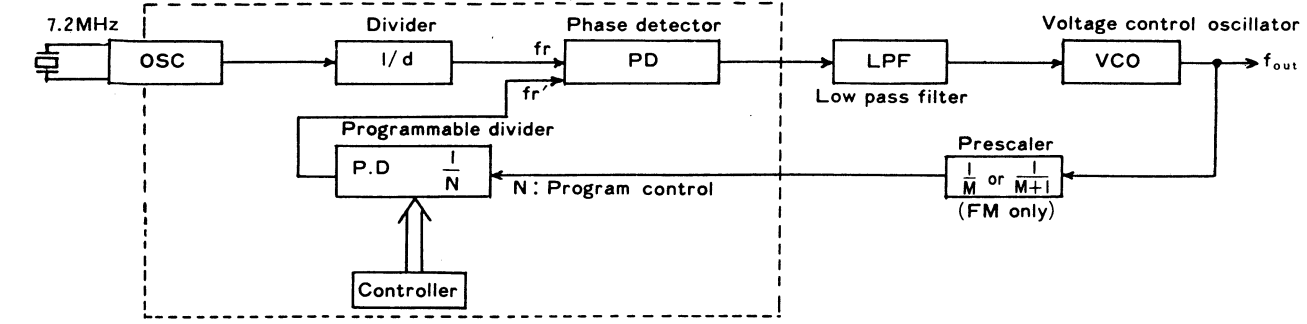


The illustration above is a block diagram which is a fundamental PLL frequency synthesizer.

In order to obtain reference frequency fr, the frequency of 7.2 MHz generated from a crystal oscillator (OSC) is passed into a divider circuit of 1/d.

This fr is compared with fr', and runs through phase detector (PD) and low pass filter (LPF) to be inverted to direct-current signal, which is then applied as varicap voltage of voltage control oscillator (VCO), thereby controlling the oscillation frequency.

This oscillation frequency $f_{out}$ is divided down to 1/N by programmable divider (PD), so that one closed loop is fixed in the relation of

$$f_{out} = fr \times N$$

therefore, the operation of PLL is stabilized.

In the case of automatic channel selection, the dividing ratio N is altered by the PD by a command from controller, and $f_{out}$ is changed accordingly.

### Programmable divider

Since the oscillation frequency of VCO is very high as compared with fr, it is divided down to 1/N (in the case of AM) to decrease the difference from fr in this circuit.

### Phase detector

This is a circuit to detect the difference in frequency and phase between reference frequency fr and comparison frequency fr' in terms of pulses.

### Low pass filter

This circuit is intended to vary and fix the output voltage in order to deliver a varicap voltage necessary for desired VCO frequency, on the basis of the output of the phase detector.

### Prescaler

The local oscillation frequency in FM is higher than the operating speed of the programmable divider of PLL, thereby opposing to accurate operation. To avoid this, the local oscillation frequency is preliminarily divided down in this circuit to a proper frequency permitting reliable operation of the programmable divider.

Pulse swallow count system is employed. A couple of programable divider (swallow counter and programable counter) can be selected.



$$f_{osc} = \left\{ (M+1)N_1 + M(N_2 - N_1) \right\} fr'$$
$$= (MN_2 + N_1) fr'$$
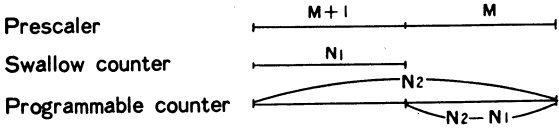


The prescaler at first starts the frequency division with the ratio M+1. Then swallow counter and programmable counter start counting simultaneously. When $N_1$ inputs are applied, swallow counter stops counting. Then the frequency division ratio of the prescaller is switched to M. Programmable counter continues to count however and stops when the input reaches $N_2$. The frequency division ratio of the prescaller switches back to M+1 and swallow counter and programmable counter start to count again.

FM reception employs the pulse swallow count system. AM reception does not employ the pulse swallow count system but employs the direct frequency division system and so only programmable counter is operated.

## 2. GENERAL DESCRIPTION OF LOGIC IC (IC901)

This IC includes PLL and controller is a C-MOS LSI for digital tuning of FM/MW/LW PLL frequency synthesizer system and controls such functions as FM/MW/LW automatic channel selection, preset memory and frequency digital display.

Pins in IC901

| PIN No. | SYMBOL | | FUNCTIONAL EXPLANATION |
|---|---|---|---|
| | IN | OUT | |
| 1 | GND | | Ground (0V) |
| 2 | XT | | Crystal OSC terminal (7.2 MHz) |
| 3 | XT | | " |
| 4 | FM | | FM band determination |
| 5 | MW | | MW " |
| 6 | LW | | LW " |
| 7 | MANUAL | | Manual tuning mode |
| 8 | AUTO | | Auto search tuning mode |
| 9 | UP | | Up operation key signal |
| 10 | DOWN | | Down operation key signal |
| 11 | STO | | Memory store command |
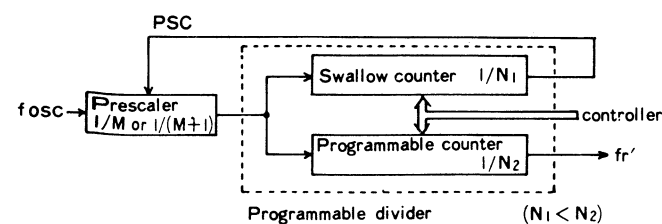
# DESCRIPTIONS

| | SYMBOL | | FUNCTIONAL EXPLANATION |
|---|---|---|---|
| | IN | OUT | |
| 12 ≀ 17 | MI—M6 | | Preset memory channel determination |
| 18 ≀ 21 | | LI—L4 | Dot display output |
| 22 | OSC2 | | AM OSC terminal |
| 23 | OSCI | | FM      〃 |
| 24 ≀ 27 | | H4—HI | Dot display output |
| 28 | | MUTE | Muting output signal ( "H") |
| 29 | E2 | | Area determination |
| 30 | EI | | |
| 31 | | Pee | "Pee" sound output |
| 32 | IF in | | AM-IF signal. Auto search stops. |
| 33 | STOP | | Auto search stop signal ("H") |
| 34 | DO—2 | | Phase comparator output |
| 35 | DO—I | | |
| 36 | TEST | | Test terminal |
| 37 | FM in | | FM programmable counter input |
| 38 | | PSC | Prescaler I/ 30 or I/32 divider select |
| 39 | AM in | | AM programmable counter input |
| 40 | INH | | Inhibition input ("L") |
| 41 | INT | | Initialize input ("L") |
| 42 | VDD | | (5 ± 0.5 V) |

## 3. AUTO TUNING AND AUTO STOP

a) FM band

When High level signal is applied to STOP terminal (33pin),
FM auto search tuning stops.

b) MW/LW band

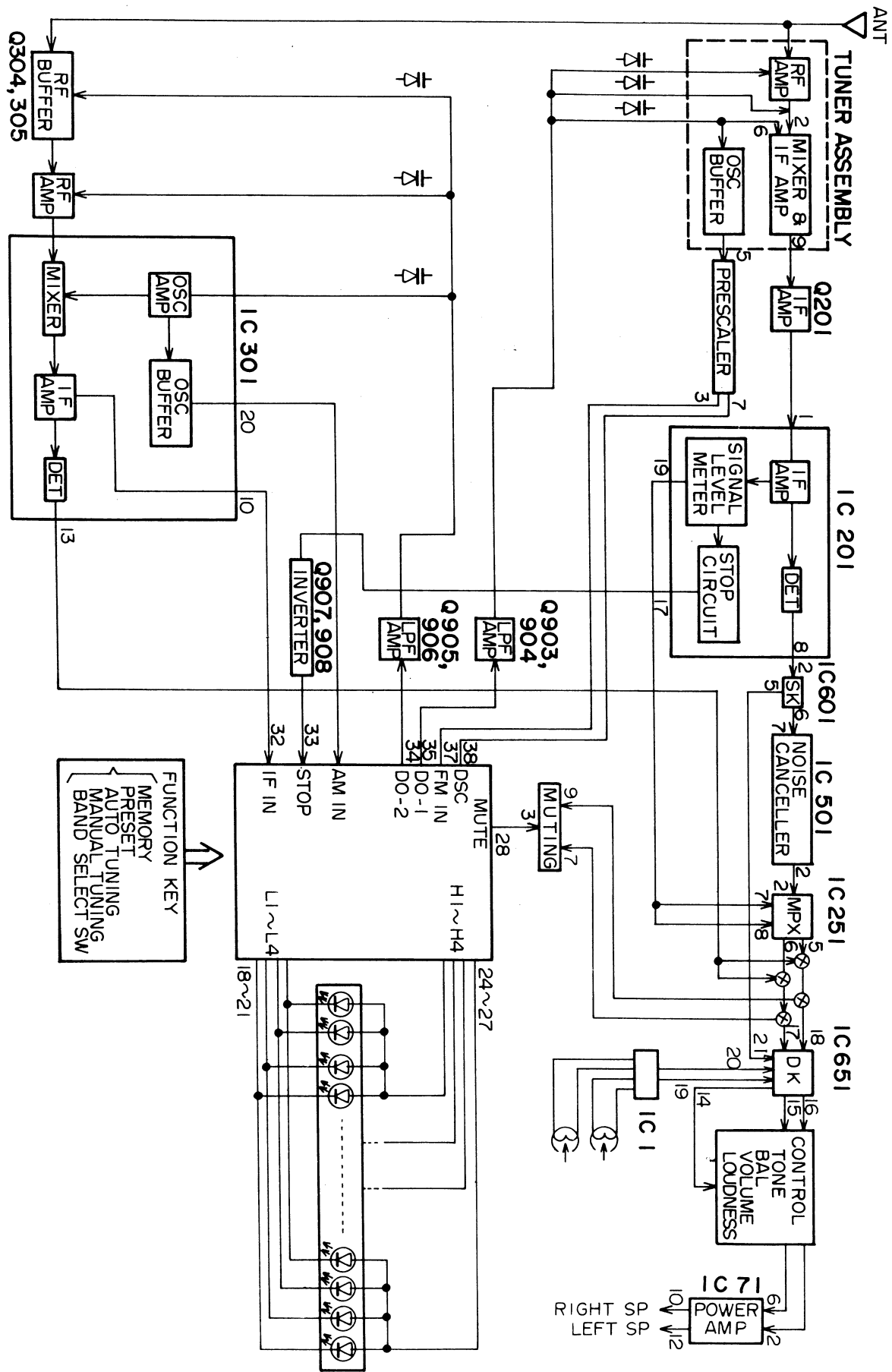When the regulated frequency is supplied to IF in terminal
(32 pin), AM auto search tuning stops.
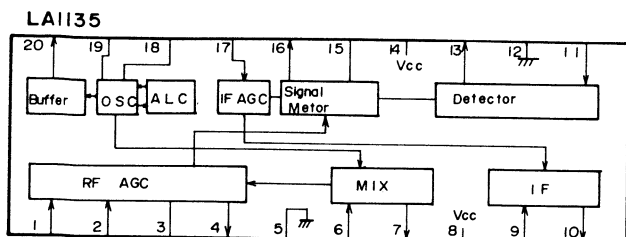
Regulated frequency

| | |
|---|---|
| MW | 450kHz ± 3kHz |
| LW | 450kHz ± 600Hz |

$V_{IN}$ (IF) $\geq 0.5 V_{P-P}$

## IC301, LA1135

LA1135



## IC251, LA3373
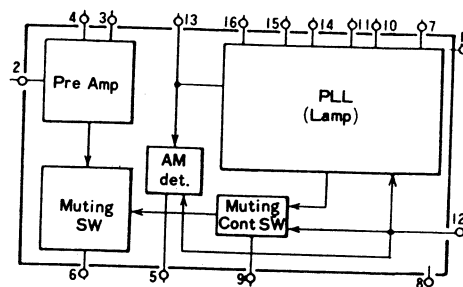


## IC601, LA2205



## IC901, TC9146AP